Claim Listing This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-22. (withdrawn)

23. (currently amended) A composition useful for detecting and quantitating DNA-activated protein kinase (DNA-PK) activity in a biological sample, comprising a synthetic peptide substrate defined by the following features to provide specific recognition and phosphorylation by DNA-PK: (1) ~~a~~ one phosphate-accepting amino acid pair ~~which may include~~ selected from the group consisting of serine-glutamine (Ser-Gln) (SQ), threonine-glutamine (Thr-Gln) (TQ), glutamine-serine (Gln-Ser) (QS), or glutamine-threonine (Gln-Thr) (QT); (2) enhancer amino acids, selected from the group consisting of ~~which may include~~ glutamic acid or glutamine, immediately adjacent at the amino- or carboxyl- side of the amino acid pair and forming an amino acid pair-enhancer unit; (3) a first spacer sequence at the amino terminus of the amino acid pair-enhancer unit; (4) a second spacer sequence at the carboxyl terminus of the amino acid pair-enhancer unit, which spacer sequences may include any combination of amino acids that does not provide a phosphorylation site consensus sequence motif for another protein kinase; and (5) a tag moiety, which may be an amino acid sequence or another chemical entity that permits separating the synthetic peptide from the phosphate donor.

24. (cancelled)

Claims 25-28. (withdrawn)

29. (original) The composition of Claim 23, wherein said first and second spacer sequences exclude serine, threonine and tyrosine.

Claims 30-32. (cancelled)

33. (currently amended) The composition of Claim ~~32~~ 29, wherein said synthetic peptide substrate is selected from the group consisting of Glu Pro Pro Leu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 11), Glu Pro Pro Gln Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 15), Glu Pro Pro Leu Thr Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 16), Pro Glu Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 18) and Pro Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 19).

Claim 34. (cancelled)

Claim 35. (currently amended) A composition ~~according to Claim 34, wherein the~~ useful for detecting and quantitating DNA-activated protein kinase (DNA-PK) activity in a biological sample comprising a synthetic peptide substrate ~~is~~ selected from the group consisting of Glu Pro Pro Leu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 11), Glu Pro Pro Gln Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 15), Glu Pro Pro Leu Thr Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 16), Pro Glu Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 18) and Pro Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 19).

Claim 36. (currently amended) A kit for detecting and quantitating DNA-activated protein kinase (DNA-PK) activity, comprising:

(a) a detectably-labeled phosphate donor;

(b) a composition useful for specific detection and quantitation of DNA-PK which comprises a synthetic peptide substrate defined by the following features to provide specific recognition and phosphorylation by DNA-PK: (1) ~~a~~ one phosphate-

accepting amino acid pair ~~which may include~~ selected from the group consisting of serine-glutamine (Ser-Gln) (SQ), threonine-glutamine (Thr-Gln) (TQ), glutamine-serine (Gln-Ser) (QS), or glutamine-threonine (Gln-Thr) (QT); (2) enhancer amino acids, selected from the group consisting of ~~which may include~~ glutamic acid or glutamine, immediately adjacent at the amino- or carboxyl- side of the amino acid pair and forming an amino acid pair-enhancer unit; (3) a first spacer sequence at the amino terminus of the amino acid pair-enhancer unit; (4) a second spacer sequence at the carboxyl terminus of the amino acid pair-enhancer unit, which spacer sequences may include any combination of amino acids that does not provide a phosphorylation site consensus sequence motif for another protein kinase; and (5) a tag moiety, which may be an amino acid sequence or another chemical entity that permits separating the synthetic peptide from the phosphate donor; and

(c) a means for detecting a labeled synthetic peptide substrate, whereby detection of labeled synthetic peptide substrate is utilized to determine an amount of DNA-PK activity in said biological sample.

37. (original) The kit of Claim 36, further including double-stranded DNA.

38. (currently amended) The kit of Claim 37, wherein said double-stranded DNA is ~~substantitally~~ substantially linear.

39. (original) The kit of Claim 36, wherein said detectably labeled phosphate donor is selected from the group consisting of gamma labeled [^{32}P]-ATP, [^{32}P]-dATP, [^{33}P]-ATP, [^{33}]-dATP and mixtures thereof.

40. (original) The kit of Claim 39, wherein said detectably labeled phosphate donor is [^{32}P]-ATP.

Claims 41-43. (cancelled)

44. (currently amended) The kit of Claim ~~43~~ 36, wherein said synthetic peptide substrate is selected from the group consisting of Glu Pro Pro Leu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 11), Glu Pro Pro Gln Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 15), Glu Pro Pro Leu Thr Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 16), Pro Glu Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 18) and Pro Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 19).

Claim 45. (cancelled)

46. (currently amended) The kit of Claim ~~45,~~ 36, further including a negative control peptide wherein said negative control peptide is identical in amino acid composition to said synthetic peptide substrate.

47. (original) The kit of Claim 46, wherein said negative control peptide is selected from the group consisting of Glu Pro Pro Leu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 20) and Pro Glu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 23).

Claim 48. (cancelled)

49. (currently amended) The kit of Claim ~~48~~ 36, ~~wherein said~~ further including a negative control peptide ~~is~~ selected from the group consisting of Glu Pro Pro Leu Ala Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 21), Pro Glu Glu Ala Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 24) and Pro Glu Glu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 25).

50. (original) The kit of Claim 36, further including buffers.

51. (original) The kit of Claim 36, further including a preparation of DNA-PK.

52. (original) The kit of Claim 36, further including a reagent to detect a labeled synthetic peptide substrate.

Claims 53-98. (withdrawn)

99. (currently amended) A kit for detecting and quantitating DNA-activated protein kinase (DNA-PK) activity, comprising:

(a) a phosphate donor;

(b) a composition useful for specific detection and quantitation of DNA-PK which comprises a synthetic peptide substrate defined by the following features to provide specific recognition and phosphorylation by DNA-PK: (1) ~~a~~ one phosphate-accepting amino acid pair ~~which may include~~ selected from the group consisting of serine-glutamine (Ser-Gln) (SQ), threonine-glutamine (Thr-Gln) (TQ), glutamine-serine (Gln-Ser) (QS), or glutamine-threonine (Gln-Thr) (QT); (2) enhancer amino acids, selected from the group consisting of ~~which may include~~ glutamic acid or glutamine, immediately adjacent at the amino- or carboxyl- side of the amino acid pair and forming an amino acid pair-enhancer unit; (3) a first spacer sequence at the amino terminus of the amino acid pair-enhancer unit; (4) a second spacer sequence at the carboxyl terminus of the amino acid pair-enhancer unit, which spacer sequences may include any combination of amino acids that does not provide a phosphorylation site consensus sequence motif for another protein kinase; and (5) a tag moiety, which may be an amino acid sequence or another chemical entity that permits separating the synthetic peptide from the phosphate donor; and

(c) a means for detecting a phosphorylated synthetic peptide substrate, whereby detection of said phosphorylated synthetic peptide substrate is utilized to determine an amount of DNA-PK activity in said biological sample.

100. (original) The kit of Claim 99, wherein said phosphate donor is ATP.

101. (currently amended) The kit of Claim 99, wherein said synthetic peptide substrate is selected from the group consisting of Glu Pro Pro Leu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 11), Glu Pro Pro Gln Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 15), Glu Pro Pro Leu Thr Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 16), Pro Glu Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 18) and Pro Glu Ser Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 19).

102. (currently amended) The kit of Claims 99, further including a negative control peptide ~~of similar composition to the synthetic peptide substrate which is not phosphorylated by DNA-PK~~ selected from the group consisting of Glu Pro Pro Leu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 20), ~~and~~ Pro Glu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 23), Glu Pro Pro Leu Ala Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 21), Pro Glu Glu Ala Gln Glu Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 24) and Pro Glu Glu Ser Glu Gln Ala Phe Ala Asp Leu Trp Lys Lys (SEQ ID NO: 25).

103. (original) The kit of Claim 99, further including buffers.

104. (original) The kit of Claim 99, further including a preparation of DNA-PK.

105. (original) The kit of Claim 99, further including a reagent to detect a phosphorylated peptide substrate.

Claims 106-111. (withdrawn)